AI for Research

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# Introduction

## What is Artificial Intelligence?

AI (Artificial Intelligence) is generally considered to be a vague term by many, but this holds no weight. This is because AI is confused with ML (Machine Learning); whereas AI is a script that handles inputs, processes these inputs, and then react depending on these inputs, ML is what makes the script learn. AI can be as simple as a simple card-game playing script or even as complex as a recommendation system. However, it should be noted that AI is hard-coded, so it is a pre-defined script with pre-defined answers. If the AI is wrong, it will require a developer to fix the script. What ML adds to an AI requires an AI to be created with ML in mind, as the code required for an AI to support ML is far different then an AI without ML. ML operates by adjusting the inputs by their respective weights (A number that represents the importance of that weight); the weights alter themselves depending on how close they were to the expected output and then re-try. However, the altering of the weights only comes in when the Model is in the process of being developed, not after it is developed. A model is what an AI with ML is called after it has been trained enough until its weights are accurate enough. After a model is trained, an accuracy rating will be available, this accuracy rating judges either how far off the AI can be from the correct answer or the probability of being wrong when a model is given data to give predictions off of. It should be noted that the “probability” of being wrong is not a probability of chance, but how reliable the model is when it is given data that is not as easily recognizable as regular data. (Jarek & Mazurek, 2019)

## Applications of AI

AI has a very wide plateau of applications in almost every field; one of the more explored fields of applications for AI is the field of marketing. In a study conducted in 2019 by Krystyna Jarek and Grzegorz Mazurek, applications of AI in marketing are: Voice processing technologies *(Using e-shopping to buy products via voice-activated software or executing tasks such as setting timers or adjusting integrated home-appliances via voice software or dedicated hardware such as Siri)*, text processing technologies *(Augmented reality which provides a virtual assistant as you navigate around shopping centers, high lighting what you are after or giving an explanation of what you are looking at and another type of augmented reality which not only acts as a GPS but doubles as a touring guide, recommending point of interests that the user might be interested in),* Image recognition and processing technology *(Facial recognition replaces passwords when making payments with your e-banking card or application or image recognition which tries to analyze the object in the photo and then search for information about it or related products),* decision making (Product recommendation such as Netflix’s recommendation system or Amazon) and in automated robotics and vehicles (Inventory stock taking robots & service free shops). (Jarek & Mazurek, 2019)

# Methodology

This paper will closely follow a tutorial provided by visualstudiomagazine (James, 2018). The tutorial makes use of the Python 3 programming languages, Keras, Tensorflow and a set of movie reviews from IMDB. The format of the reviews are as follows: Limited to a number of words, have already been tagged and if the number of words in the review are less than the limit, empty padding will be added.

Three models will be created; the first model will be an exact re-creation of the model in the tutorial, the second model will have slightly altered variables as to produce more accurate results to see if the model can do better, while the third model will be a very serious attempt at creating a very accurate model that can match expectations. In the third model, the variables will be set as follows: the amount of unique words will be set to 50,000 words (Changed from the suggested 20,000), the model will limit reviews to have a maximum of 1,000 words in it (Changed from the suggested 80) and the embedded vector length will be 500 (The higher bound of suggested common use).

Each model will be locally saved, and a Python 3 script that can make use of the models will be created. The Python 3 script will ask the user which version of the model the user wants to use & then prompt the user to input a review. Afterwards, the model will try to predict what the review-score would have been with the given review.

The models will be tested with various types of data, such as: Invalid use, non-existent words, professional reviews, common reviews, reviews with mis-spelled words and reviews that are sarcastic.

# Results

The results given were very desirable, as most of the predictions given by the model were what close to or even more accurate than would be expected. There were some cases where the model failed to predict correctly, in one specific case where the review was “This film was mediocre at best”, the model predicted that the would-be scored would have been even worse than a review stating “This film is terrible”; this most likely happened due to the word mediocre not being known by the model.

Discussion

Log Book

3/09/2020

Discussed with my mentor about my objectives, methodology.

My mentor also gave me some recommendations on how to approach writing my project and how to form a good research question and hypothesis.

Also discussed potential limitations at this current stage, and how things might change.

4/05/2020

Presented a few problems to my mentor and then received some assistance.

4/06/2020

My mentor provided me with a solution to my sources problem by pointing out that I will effectively be doing “sentimental analysis” and then provided me with a dataset suitable for my objectives.

4/17/2020

My mentor provided me with a reference of where I should start trying to achieve my goal, “Python for NLP: Word Embeddings for Deep Learning in Keras”

# Bibliography

James, M., 2018. *visualstudiomagazine.* [Online]   
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Jarek, K. & Mazurek, G., 2019. *Marketing and Artificial Intelligence.* [Online]   
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